

Applicant: Pekka Koivukunnas et al.
PCT App. No.: PCT/FI2003/000551

Claim Listing

1–18. (cancelled)

19. (new) An apparatus forming part of a calender for guiding a web in the calender from one nip to another nip and for doctoring a calender roll, the apparatus comprising:

- a guide having least one stationary and convex web guide surface extending in a cross direction which receives the web from a first nip of the calender and is arranged to guide the web toward a subsequent nip of the calender;
- a doctor attached to and supported on the guide; and
- a gas medium layer, between the guide surface and the web, which carries the web.

20. (new) The apparatus of claim 19, wherein the guide further comprises a first part which serves as the at least partly convex web guide surface, and a second part opposite to that of the first part; wherein the doctor comprises a doctor blade which is attached to the guide second part by a support arm.

21. (new) The apparatus of claim 20, wherein the first part of the guide is formed of a cylindrical surface.

22. (new) The apparatus of claim 19, wherein the guide further comprises:
a first part comprised of an at least partly convex guide plate, an outer surface of the at least partly convex guide plate defining the guide surface with edge zones where the web engages and leaves the guide surface; and
a second part of the guide which extends between the edge zones of the guide plate in the cross direction, which second part supports and stiffens the guide.

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23. (new) The apparatus of claim 22, wherein the doctor blade is attached to the second part of the guide and faces a calender roll so that the doctor blade is directed, while supported by the second part, towards the calender roll.

24. (new) The apparatus of claim 19, wherein the radius of curvature of the guide surface is invariable.

25. (new) The apparatus of claim 19, wherein the radius of curvature of the guide surface varies.

26. (new) The apparatus of claim 19, wherein the gas medium layer is supplied by a gas film between the web and the guide surface brought about by the movement of the web from the nip towards the guide.

27. (new) The apparatus of claim 19, wherein the web guide surface has a plurality of gas flow passages connected to a source of suction through which gas is taken from the gas medium layer between the web and the guide surface.

28. (new) The apparatus of claim 19, wherein the web guide surface has a plurality of gas flow passages connected to a source of pressurized gas through which gas is supplied to the gas medium layer between the web and the guide surface.

29. (new) The apparatus of claim 28, wherein the gas flow passages are bounded by edges in the shape of a closed periphery.

30. (new) The apparatus of claim 28, wherein the plurality of gas flow passages are arranged to extend substantially in the cross direction across the guide surface, and each gas flow passage has edges bounding each gas flow passage, and said edges are substantially parallel to and spaced from one another.

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31. (new) The apparatus of claim 19, wherein the guide has a shape selected from the group consisting of a straight tubular roll, a sectional roll, a bowed one-part take-out or spreader roll, or a bowed multiple-part take-out or spreader roll.

32. (new) The apparatus of claim 19, wherein the guide surface for the web is part of a doctor beam to which a doctor blade is attached by a doctor support arm.

33. (new) The apparatus of claim 19, wherein the convex guide surface has at least two outwards curved guide surface parts placed one after the other in a direction defined by web travel.

34. (new) The apparatus of claim 19, further comprising at least one cross-direction extending air guide member which is attached to the guide and the air guide member is arranged to converge with the web as the web moves on to the guide surface to guide gas to the gas medium layer between the guide surface and the web.

35. (new) A method for guiding a web in a calender from a first nip to a second nip, comprising the steps of:

causing the web to pass from the first nip defined between a first and a second calender roll to the second nip over a stationary guide which has a convex web guide surface which extends in a cross machine direction, the web being guided such that a gas medium layer is disposed between the web and the stationary guide, the gas medium layer carrying the web; and
doctoring the second calender roll with a doctor which is attached to and supported on the stationary guide.

36. (new) The method of claim 35 wherein the stationary guide has a plurality of passages formed therein, and wherein the gas medium layer is in communication with the passages.

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37. (new) The method of claim 36 wherein the guide has a central cavity with which the plurality of passages communicate, and further comprising the step of maintaining a constant pressure on the central cavity to maintain a to-and-fro flow in the passages into which gas medium can be conducted to pass a flow through the passages to a space between the web and the guide surface.

38. (new) The method of claim 36 wherein the guide has a central cavity with which the plurality of passages communicate, and further comprising the step of sucking gas medium from the central cavity to produce a flow through the passages away from a space between the web and the guide surface.